NEW TRENDS IN MANAGEMENT OF VARICOSE VEINS OF LOWER LIMBS

Essay

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SUMMARY AND CONCLUSION

Varicose veins are one of the most common vascular problems that appear in large portion of the population affecting about 10-40% of the age group between 30-70 years old being more common in the elderly population as well as it is more commonly seen in females, during pregnancy period and with occupations requiring prolonged standing time.

Varicose veins are abnormally enlarged and tortuous vessels caused by incompetent valves in the venous system that allow blood leakage or reflux. They are the visible surface manifestations of an underlying syndrome of venous in sufficiency. Venous insufficiency syndrome allow venous blood to escape from its normal flow pathway and flow in retrograde direction.

Symptoms associated with varicose veins are burning pain, throbbing, swelling, feeling of heaviness, skin pigmentation, ulceration and thrombophlebitis.

First line treatment of varicose veins includes conservative methods such as: exercise, weight reduction, elevation of the legs avoidance of prolonged immobility and compression therapy. When these measures failed other measures are considered.

Good understanding of the anatomy and associated anomalies together with high skilled professional radiologist and high quality Doppler equipped ultrasound machine are cornerstone in treatment.

The newest techniques for vein ablation use thermal energy delivered to the endovenous wall by means of laser or by radiofrequency (RF) heating or by foam sclerotherapy. These may be the first truly new approaches to vein treatment in the past years.

CONTENTS

Aim Of Work

The Aim Of this work is to discuss the new trends in management of varicose veins of lower limb, and enumerate the results of new trends versus surgery.

INTRODUCTION

Varicose veins are generally identified by their tortousity, bulging,Superficial appearance on the lower extremities. They also can be found in the vulva, spermatic cords (varicoceles), rectum,anal canal (hemorrhoids), and esophagus (esophageal varices).Varicose veins are a common problem, with widely varying estimates of prevalence. In general, they are found in 10 to 20 percent of men and 25 to 33 percent of women. ***(Bergan et al; 2006)***

The etiology of varicose veins is multifactorial and may be primary as congenital weakness of mesenchyme or secondary as increased intravenous pressure caused by prolonged standing; increased intra-abdominal pressure arising from tumor, pregnancy, obesity, or chronic constipation; secondary to deep venous thrombosis; or less commonly, arteriovenousshunting.Shear forces and inflammation have recently been recognized as important etiologic factors for venous disease***. (Bergan et al; 2006)***

The clinical presentation of varicose veins varies among patients. Some patients are asymptomatic. Symptoms, if present, are usually localized over the area with varicose veins; however, they may be generalized to include diffuse lower extremity conditions. Localized symptoms include pain, burning, or itching. Generalized symptoms consist of leg aching, fatigue, or swelling. Symptoms are often worse at the end of the day, and usually disappear when patients sit and elevate their legs***. (Teruyaet al; 2004)***

Imaging studies are generally not necessary for diagnosis, but they may be useful in patients with severe symptoms or in patients who are obese. They also may be helpful for planning procedures, documenting the extent of vascular pathology, or identifying the source of venous reflux. Duplex Doppler ultrasonography is a simple, noninvasive, painless, readily available modality that can assess the anatomy and physiology of the lower extremity venous system. Other less commonly used studies that may be helpful in select patients include

venography, light reflex rheography, ambulatory venous pressure measurements, photoplethysmography, air plethysmography, and foot volumetry. ***(Campbell et al; 2006)***

Conservative treatment options include avoidance of prolonged standing and straining, elevation of the affected leg, exercise, external compression, loosening of restrictive clothing, medical therapy, and modification of cardiovascular risk factors***. (Bartholomew; 2006)***

Sclerotherapy involves injecting superficial veins with sclerosing material that causes them to fibrose and collapse permanently. sclerotherapy has been in use for nearly a century to treat both telangectasias and small (<6mm) isolated varicose veins***.(Campbell et al;2006)***

Surgery is the best known treatment for varicose veins, especially when long and short saphenous veins are involved. However, some literature does not consistently support surgery as the definitive treatment option. ***(Bergan et al; 2006)***

External laser treatment include multiple laser machines that deliver various wavelengths of light through the skin and into the blood vessels are available to treat any small, straight vein branch However, laser therapy has typically been used on telangiectasias and smaller veins rather than on larger veins***.(Campbell et al;2006)***

Foam sclerotherapy **(FST)** offers a number of advantages over traditional sclerotherapy, and allows a skilled practitioner to treat veins of larger diameter, including saphenous trunks. The ease of use, low complication rate, and high rate of efficacy make foam sclerotherapy an important tool in the treatment of varicose veins and venous ulcerations ***(Wright et al; 2006).***

Advances in imaging and catheter technology made the development of Endovenous laser treatment **(EVLT)** possible. EVLT offers patients a fast

outpatient procedur with minimal downtime and discomfort. The procedure is durable and safe It is versatile and allows the practitioner to treat incompetence of the saphenous trunks and accessory branches ***(Ravi et al; 2006).***

Endovenous laser treatment (EVLT) and radiofrequency ablation **(RF)** are rapidly becoming a standard of care in the treatment of varicose veins, because they can offer treatment in an outpatient setting and patients can return to normal activity levels almost immediately ***(Ravi et al; 2006).***

ANATOMY OF THE VENOUS SYSTEM OF THE LOWER LIMB

Venous anatomy is very variable in some parts but more constant in other parts of the lower limbs. In the past, a wide range of terms including eponymous names was used to describe lower limb veins. A recent publication by ***Caggiati et al***. unified terminology and definitions for the venous system with particular reference to the lower limb, and the present consensus is based on that presentation. It uses English terms to describe veins rather than less generally used Latin terms or eponymous nomenclature ***(Cavezzi et al, 2006)***.

Historical background:

The fascinating history of venous surgery has been the subject of many reviews and monographs. The first written record of varicose veins and suggestions on treatment were found in the Ebers papyrus around 1550 BC. The first illustration of a varicose vein, discovered in Athens at the foot of the Acropolis, dates back to the 4th century BC. It is a commonly reproduced votive tablet that shows a large leg with a serpentine varicose vein on its medial aspect ***(Majno, 1975)***.

Fig. (1): *Votive tablet found at the base of the Acropolis in Athens, the earliest known illustration of varicose veins* ***(Gloviczki, 2006).***

The 15th century brought new interest in venous anatomy, as illustrated in Leonardo da Vinci's drawings of the human body, and in the 16th century, the anatomy of the venous system was presented in great details in the works of Andreas Vesalius ***(Gloviczki, 2006).***

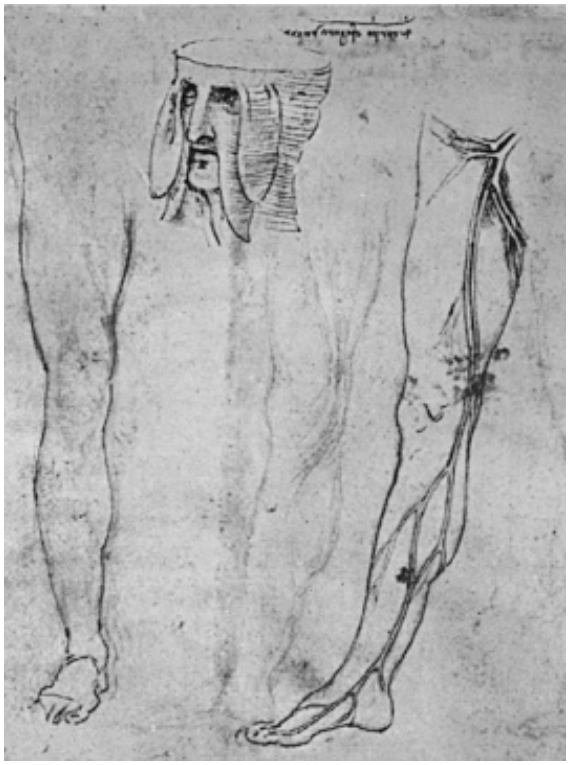

Fig. (2)*: The saphenous vein by Leonardo da Vinci* ***(Gloviczki, 2006).***

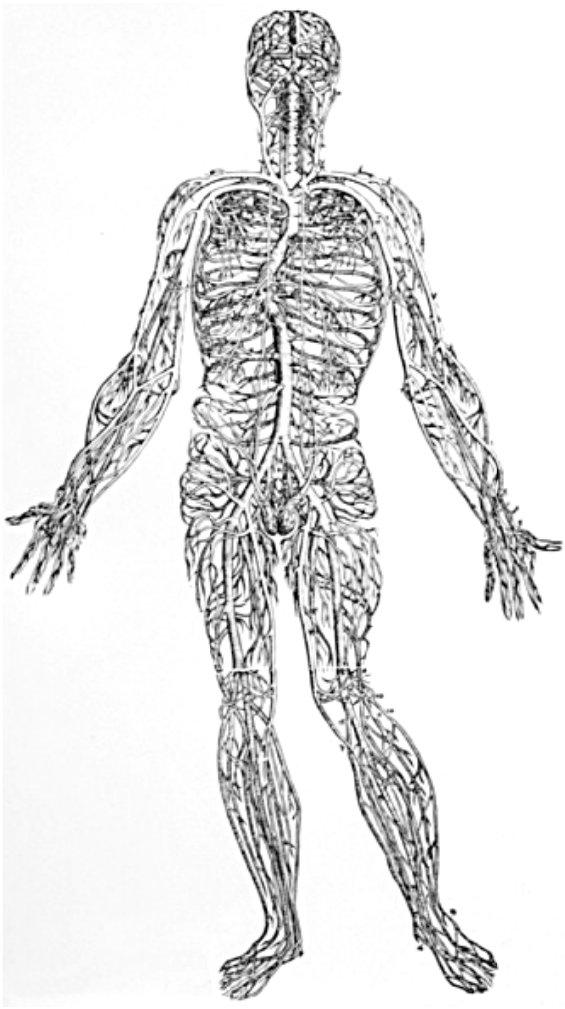

Fig. (3)**: The venous system according to Vesalius (1545) **(Caggiati et al., 2006).

Developmental anatomy:

By the fourth week of the intrauterine fetal life, a swelling of the lateral embryonic body wall forms the limb buds. They are richly vascularized, where the arteries are axial, while the veins are marginal. There are a couple of veins present on each side. The anterior marginal vein is pre-axial and the posterior marginal vein is post-axial; both drain separately into the posterior cardinal vein ***(Williams et al., 1989).***

In the adult life the pre-axial vein of the lower limb become the great or long saphenous vein, which more proximally gives rise to the proximal femoral and the external iliac veins. The post-axial vein becomes the lesser or the short

saphenous vein, which more proximally gives rise to the popliteal, inferior gluteal and internal iliac veins as a portion of the posterior cardinal vein ***(Williams et al., 1989).***

Histology (Microanatomy) of the veins of the lower limbs:

Veins are characterized by thin wall in comparison to arteries of similar size and by large capacitance. Wall thickness is not correlated exactly to the size of the vein, e.g. the wall is thicker in veins of the leg than it is in veins of a similar size of the arm ***(Gray's, 2005).***

Veins have walls consisting of three concentric layers:

1. The intima (tunica intima), is the inner most layer. Its main component, the endothelium which is a monolayer of flattened polygonal cells.
2. The media (tunica media), is made of muscle tissue, elastic fibers and collagen.
3. The adventitia (tunica adventitia), is the outer coat of the vessel, and consists of connective tissue, nerves and vessel capillaries. It links the vessel to the surrounding tissues. ***(Gray's, 2005)***

Most veins have valves to prevent reflux of blood. A valve is formed by an inward projection of the tunica intima, strengthened by collagen and elastic fibers, and covered by endothelium which differs in orientation on its two surfaces. Surfaces facing the vessel wall have transversely arranged endothelial cells, whereas on the luminal surface of the valve, over which the main stream of blood flows, cells are arranged longitudinally in the direction of flow. Most commonly two or occasionally three, valves lie opposite one another, sometimes only one is present. They are found in small veins or when tributaries join larger veins. The valves are semilunar (cusps) and attached by their convex edges to the venous wall. Their concave margins are directed with the flow and lie against the wall as long as flow is towards the heart. When blood flow reverses, the valves close and blood fills an expanded region of the wall, a sinus, giving the 'knotted' appearance of the distended veins ***(Gray's, 2005).***

Anatomy of the superficial venous system

Saphenous veins and junctions

***GSV—great saphenous vein*:** The term great saphenous vein (vena saphena magna) abbreviated as GSV should be used instead of terms such as long, greater or internal saphenous vein. It is recommended to avoid the term 'long saphenous vein' to prevent confusion caused by the abbreviation LSV which could refer to either the long saphenous or lesser saphenous vein.

***SFJ—saphenofemoral junction*:** The saphenous vein terminates at the SFJ. The SFJ is at the level of the groin skin crease and is covered by superficial fascia that ends proximally at the inguinal ligament. The terms 'confluence of superficial inguinal veins' (confluens venosus subinguinalis), also known as the 'crosse' by many clinicians, or the Venenstern unter dem Leistenband of German anatomists, correspond to the veins of the SFJ.

***AASV—anterior accessory saphenous vein**:* The anterior accessory saphenous vein (vena saphena magna accessoria anterior) refers to a venous segment ascending parallel to the GSV in the thigh and located anteriorly within a fascial compartment in the thigh shown by ultrasound to have its own saphenous compartment.

***PASV—posterior accessory saphenous vein**:* The posterior accessory saphenous vein (vena saphena magna accessoria posterior) refers to a venous segment ascending parallel to the GSV and located posteriorly, shown by ultrasound to be contained within a fascial compartment in the thi gh. This vein is not found as often as the AASV and its connection with GSV is not constant.

SSV—small saphenous vein: The term small saphenous vein (vena saphena parva) abbreviated as SSV should be used instead of short, external, or lesser saphenous vein. The small saphenous vein passes between the heads of gastrocnemius and frequently terminates by joining the popliteal vein in the popliteal fossa.

SPJ—saphenopopliteal junction: The SPJ is the termination of the SSV with the popliteal vein. This most often lies 2–4 cm above the popliteal skin crease[8] but its exact location is variable.

TE—the thigh extension of the small saphenous vein*:* This vein (extensio cranialis venae saphenae parvae) courses in the groove between the biceps femoris and semimembranosus muscles. It has been called the 'femoropopliteal vein' or cranial extension of the SSV and it terminates in one or more superficial or perforating veins of the thigh or gluteal region but not in the GSV. A cranial extension of the SSV or TE of SSV that communicates with the GSV via the posterior thigh circumflex vein is termed the vein of Giacomini (GV) ***(Cavezzi et al, 2006)***.

Venous tributaries

Lateral venous system: The lateral venous system (sistema venosa lateralis membri inferioris or Albanese system) is on the lateral thigh and leg and may represent the remnant of the embryonic lateral marginal vein (vena marginalis lateralis).

The anterior thigh circumflex vein: The anterior thigh circumflex vein (vena circumflexa femoris anterior) is a tributary of the GSVor AASV that ascends obliquely in the anterior thigh. It may originate from the lateral venous system.

The posterior thigh circumflex vein: The posterior thigh circumflex vein (vena circumflexa femoris posterior) is a tributary of the GSV or PASV which ascends obliquely in the posterior thigh. It may originate in the SSV, its thigh extension, or the lateral venous system.

Intersaphenous veins: One or more intersaphenous vein(s) [vena (e) intersaphena(e)] course obliquely in the leg to connect the SSV and GSV***(Cavezzi et al, 2006)***.

Anatomy in the great saphenous venous territory

The GSV commences its course anterior to the medial malleolus and passes upwards along the tibial edge of the medial calf to cross the knee and then along the medial thigh to the SFJ. The GSV has a constant terminal valve 1–2 mm distal to the SFJ, which is usually easily identified on duplex ultrasound ***(Cavezzi et al, 2006)***.

There is often another pre-terminal valve a further 2 cm distal, which marks the distal limit of the SFJ area ***(Cavezzi et al, 2006)***. (Fig.4)

The most important tributaries join the GSV between the two valves, and these veins are fairly constant and readily identified by ultrasound. These tributaries are proximal or distal. Proximal veins drain venous blood from the abdominal wall and pudendal areas, and from lateral to medial. These are the superficial circumflex iliac,superficial epigastric and superficial external pudendal veins. Proximal veins may be single or multiple and are of clinical importance because they may transmit retrograde flow into the GSV even with a competent terminal valve, reported in 28–59% of cases ***(Cavezzi et al, 2006)***.

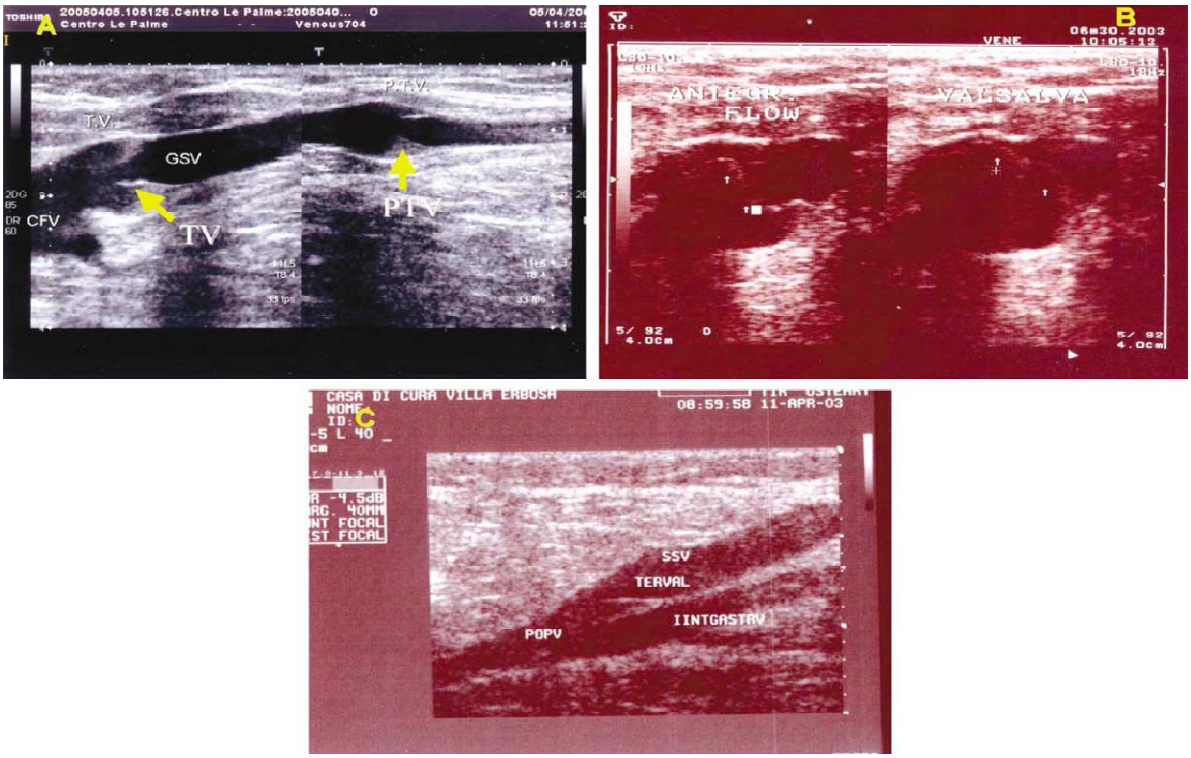

Fig. (4) *Great saphenous vein (GSV) and small saphenous vein (SSV) terminal valve (TV) and pre-terminal valve (PTV) (A) saphenofemoral junction and GSV; the arrow on the left indicates TVand the arrow on the right indicates PTV (B) on the left TV during antegrade flow, on the right TV during valsalva manoeuvre (the arrows indicate TV leaflets) (C) saphenopopliteal Junction and TV (TERVAL) of SSV close to the popliteal vein (POPV).*

Distal merging veins at the SFJ are often relatively large and are typically the lateral AASV which is present in 41% of subjects ***(Ricci,2002)*** joining the